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PROGRESS REPORT
of the
CONSUMER AND FOOD ECONOMICS RESEARCH DIVISION
AGRICULTURAL RESEARCH SERVICE

This progress report includes a summary of the current research of the Division and a preliminary report of progress made during the preceding year. It is primarily a tool for use of scientists and administrators in program coordination, development and evaluation; and for use of advisory committees in program review and development of recommendations for future research programs.

The summaries of progress on USDA and cooperative research include some tentative results that have not been tested sufficiently to justify general release. Such findings, when adequately confirmed, will be released promptly through established channels. Because of this, the report is not intended for publication and should not be referred to in literature citations. Copies are distributed only to members of Department staff, advisory committee members and others having a special interest in the development of public agricultural research programs.

This report also includes a list of publications reporting results of USDA and cooperative research issued between July 1, 1967, and June 30, 1968. Current agricultural research findings are also published in the monthly USDA publication, Agricultural Research. This progress report was compiled in the Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Department of Agriculture, Hyattsville, Maryland.

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INTRODUCTION

The goals of research in this Division are to improve the dietary situation, levels of living and home management practices of families and to develop guidance materials such as food budgets, dietary guides, and other aids to help families make the most advantageous use of their money and time resources. The research involves studies of the kinds, amounts, and costs of food consumed by different population groups and the practices of families in the purchase and household use of various foods; the development of tables of the nutritive values of foods; nutritional appraisal of diets and food supplies; studies of the kinds, amounts and costs of goods and services used for family living by rural households; studies of family practices in their management of financial and other resources; special economic studies of clothing and household textile use by families; and laboratory investigations basic to the development of recommendations for sizing of clothing, selection, use and care of clothing and household textiles, and the control of transmission of microorganisms by clothing and household textiles.

Research findings are disseminated to the scientific public through technical publications; to teachers and other leaders concerned with helping families and consumers, through semitechnical reports; and to consumers themselves, through popular-type publications. Two periodicals issued regularly by the Division help to disseminate research findings or current information of concern to the groups reached - Nutrition Program News prepared for members of state nutrition committees and other workers in nutrition programs; and Family Economics Review, servicing extension agents, teachers, and other professional workers interested in family and food economics and home management.

Research results are interpreted for use in rural development and other Federal antipoverty programs by a senior staff member who is an active member of a wide variety of interagency, interdepartmental and professional groups which are concerned with problems of low-income families and their solution.

The program of the Consumer and Food Economics Research Division is carried out at Hyattsville and Beltsville, Maryland, and Knoxville, Tennessee, and under contracts and cooperative agreements and grants with State Experiment Stations, universities and private research organizations. The scientific effort devoted to this research in Fiscal Year 1968 totaled 32.1 scientific man-years at Hyattsville 1/, 0.2 scientific man-year at Beltsville, 0.5 scientific man-year at Knoxville, and the equivalent of 7.4 scientific man-years in contracts, cooperative agreements and grants. The present report

1/ Includes the equivalent of 6.2 SMY's in service contracts for collection and chemical analyses of various types of foods and meals.

summarizes the current program of the Division, and presents briefly the Division's progress toward the objectives of the Federal program during Fiscal Year 1968.

Five examples of recent progress in the Division's research program follow:

Fewer households have "good" diets. Comparison of data from the 1965 and 1955 ARS nationwide household food consumption surveys shows that the number of households having "good" diets has decreased since 1955. In 1955, over 60 percent of the households had diets that met the Recommended Dietary Allowances set by the Food and Nutrition Board of the National Academy of Sciences-National Research Council for all nutrients and were thus rated "good." By 1965, the percent of households having such diets had decreased to 50 percent. The proportion of diets which provided less than two-thirds of the recommended allowances for one or more nutrients increased from 15 percent in 1955 to 21 percent in 1965. These diets were rated "poor." Decreased use of milk and milk products and fruits and vegetables, the main sources of calcium, ascorbic acid, and vitamin A value was chiefly responsible for these changes in dietary levels. Although these findings do not indicate the extent of hunger and malnutrition in the United States, they do show the need for an improvement in the dietary situation. As a result, the Department has expanded educational and action programs to help bring about such improvement.

Changes in food sources of vitamins A and C. Significant changes have occurred in the source of vitamins A and C (ascorbic acid) in diets in the past 60 years. ARS nutritionists calculated that amounts of these two vitamins available in the per capita food supply are close to their levels before World War I. Shifts in sources of these nutrients reflect some marked changes in American food habits. In 1909-13, sweetpotatoes contributed over one-fifth of the total amount of vitamin A value; by 1967, they contributed only about one-twentieth. Much of the decline in use of sweetpotatoes came about because they are no longer a mainstay in the diets of many Southern rural families. In 1909-13, potatoes and sweetpotatoes accounted for over a third of the total amount of vitamin C in the national diet; now, the proportion is about a fifth. Other vegetables and fruits, including the dark green and deep yellow vegetables, now contribute a much larger share of the vitamin A value than potatoes and sweetpotatoes. The proportion of vitamin C provided by citrus fruit has increased fourfold over the past half century.

New data on body proportions. Both body dimensions and relative body proportions of 20- to 29-year-old women have changed significantly since the comprehensive USDA body measurement study of 1939-1940. Data on selected measures obtained by ARS in 1966-1967 indicates that vertical dimensions for this age group are consistently greater than at the time of the earlier study. Girth dimensions are consistently smaller except for bust girth which has not changed and maximum calf girth which is greater. In relation to total height, bust girth, hip girth, abdominal extension height and hip

height are smaller than in 1939-1940. Waist girth is smaller in proportion to both bust girth and hip girth and hip girth is smaller in proportion to bust girth. These findings have important implications for the sizing of clothing. They show the need for a study of women of other age groups. The research was done under a USDA contract by Boston University.

A better measure of income proposed to provide equivalent levels of living to farm and nonfarm families. A new yardstick for the "poverty line" for farm families is suggested from research conducted by ARS family economists. The measure of poverty developed by the Social Security Administration and generally accepted as the official one sets the income needed by farm families as 70 percent of that needed by nonfarm families. The ARS research, which is based on a model of family disbursements that takes into account family types and size, age of family head, ownership of farm, and region, indicates that farm families need at least 80 percent as much income as comparable nonfarm families. A better measure of the farm-nonfarm differential will contribute to more accurate assessment of the nation's poverty problem and to allocation of program funds to population groups where need is greatest.

FOOD CHOICES, HABITS AND CONSUMPTION
(RPA 703)

USDA and Cooperative Programs

| Location of Intramural Work | Scientist Man-years FY 1968 |
|-----------------------------|--------------------------------|
| Maryland (Hyattsville) | 11.7 |

Intramural program is supplemented by extramural support representing
2.4 SMY's at State Agricultural Experiment Stations.

Problems and Objectives

Information about food consumption and dietary levels is essential to effective consumer education in nutrition and food management, to market analyses, and to agricultural policy and program evaluations--both to provide the basis for such evaluations and to measure progress. Needed are periodic surveys of the kinds, amounts, and costs of food consumed by households and individuals in different population groups; surveys of practices of families in the purchase and use of specific foods; studies of factors affecting food choices; and nutritional appraisals of diets and food supplies. To facilitate improvement of the dietary situation, more effective ways of informing people about food and nutrition and of helping them improve their food habits are needed.

Major objectives of the research are to determine

- (1) Food consumption patterns of the nation and of specific population groups.
- (2) Nutritive value of diets and of the per capita food supply.
- (3) Household practices in food management.
- (4) Basis of food habits and how they can be changed.
- (5) Methods for educating consumers about nutrition and food management.

Progress - USDA and Cooperative Programs

A. Food Consumption and Dietary Levels - 1965 Nationwide Survey

1. Quality of diets. Amounts of food used in U.S. households in 1965 were sufficient, on the average, to provide diets meeting the Recommended Dietary Allowances set by the Food and Nutrition Board of the National Academy of Sciences. Half of the households had diets that met the allowances for all nutrients. These diets were rated "good". The other half of the households had diets that failed to meet allowances for one or more nutrients. Calcium, vitamin A value, and ascorbic acid were the nutrients most often found to be below allowances. About one-fifth of the diets provided less than two-thirds of the allowances for one or more nutrients. These diets were rated "poor".

Little difference was found in the proportion of households with diets below the allowances for one or more nutrients in the four regions--Northeast, North Central, South, and West. Southern households spent less for food than households in other regions, but they had greater nutritional return for each dollar spent.

Similar proportions of urban and rural households had good diets. More rural than urban diets were below allowances for vitamin A value and ascorbic acid. But for most other nutrients studied, more urban than rural diets were below allowances.

At each successively higher level of income, a greater percentage of households had diets that met allowances. High income of itself, however, did not insure good diets. More than one-third, 37 percent, of households with incomes of \$10,000 and over had diets that were below the allowances for one or more nutrients. Almost two-thirds, 63 percent, of the households with incomes under \$3,000 had diets that did not meet allowances for one or more nutrients. Over one-third, 36 percent, of the households with incomes under \$3,000 provided less than two-thirds of the allowance for one or more nutrients and rated poor. At this income level, poor diets were most frequent among urban households in the North Central and rural households in the South.

Fewer households had good diets in 1965 than in 1955--50 percent in 1965 and 60 percent in 1955. The proportion with poor diets increased over the 10-year period from 15 percent in 1955 to 21 percent in 1965. Decreased use of milk and milk products and vegetables and fruit, the main sources of calcium, ascorbic acid, and vitamin A value, was chiefly responsible for these changes in dietary levels.

Estimates of the concentration and location of households with poor diets by state and county were derived by statistical methods from the 1965 nationwide food consumption survey data in conjunction with Census statistics on population and income. A relatively high proportion of poor diets was found in the counties of the South and North Central Region. No county had more than 30 percent or less than 9 percent of its households with poor diets. Counties with the greatest number of households with poor diets were those with large metropolitan areas. These estimates were made in response to a request by the Committee on Agriculture, U. S. House of Representatives, in their hearings on the Stennis Bill to Provide Food and Medical Services on an Emergency Basis. The estimates were published in a report to the Committee along with an evaluation made by the Human Nutrition Research Division of published reports on clinical and biochemical studies of nutritional status.

2. Food use of farm and urban households. Both farm and urban households have shared in changes in food consumption in recent years but farm households have made more changes than urban in their use of all the major food groups except vegetables and fruits. As a result, farm households have become more like urban households in the foods they use. In spring 1955, farm households used 19 percent more milk than urban but only slightly more (4 percent) in spring 1965. Farm households used 7 percent less vegetables and fruits in 1955; only 3 percent less in 1965. They used 33 percent less purchased bakery products per person a week in 1955, but only 18 percent less in 1965. The largest difference still exists in the use of flour and cereals. In 1965 farm households were still using more than twice as much as urban families. Continued greater use of fats and sugars by farm families is

partly related to their greater use of flour and cereals. On the other hand, farm families continue to use considerably less than urban families of soups and other purchased mixtures. Some of the shifts in food habits of farm families have resulted from the decline in their production of food for home use.

3. Use of convenience foods. A larger proportion of the food dollar went for convenience foods in 1965 than a decade ago. In 1955, 27 percent of the grocery bill went for 32 types of items that were classed as convenience foods. Included, were all types of canned and frozen fruits, vegetables and juices; frozen, canned and dried potatoes; ground beef, frankfurters and other lunch meat; mixtures and soups; prepared flour mixes, bakery products (including purchased bread) and breakfast cereals; instant coffee; fruit ades and punches; canned and dry milk; frozen desserts; and commercially prepared puddings, pie fillings and icings. By 1965, the part of the grocery bill that went for these same items had increased to 30 percent. The percentage increase was greater for low- than high-income families. By 1965 low-income families were spending a slightly higher percentage of their money on these convenience foods than were the higher income groups. Farm families had upped markedly the proportion of their grocery money spent on convenience foods, in part because they were buying so much more of their food and producing less.

B. Food Management Practices

Household practices in home freezer management. Analysis of data collected during July 1964 - April 1965 from 240 urban and 242 farm families in and near Fort Wayne, Indiana, was completed. Eight of the 17 advantages of freezer ownership given by both urban and farm homemakers either mentioned or carried the implication of saving money. Six of the 17 advantages could be associated with factors of convenience.

Estimates of costs of home freezing for a year, exclusive of costs for food, averaged about \$53 for farm households and \$51 for urban households. This amounted to about 4 cents per pound of food frozen in farm households and about 5 cents per pound in urban households.

The study indicates that consumer education programs need to stress the desirability of better control of storage temperatures, of keeping inventory records and planning use of food, and of using the freezer fully to reduce the cost per pound of frozen food.

C. Nutritive Value of National Food Supply

Sweetpotatoes contributed over one-fifth of the total amount of vitamin A value in 1909-13; their contribution was halved by 1947-49, and halved again by 1967. On the other hand, dark-green and deep-yellow vegetables in 1967 accounted for over twice as large a proportion of vitamin A value as a half century ago but the proportion has changed little since 1947-49. The shift

from butter to margarine has resulted in little change in the total amount of vitamin A provided by these foods because of the fortification of margarine with vitamin A.

Shifts in consumption among vegetables and fruits have brought major changes in sources of ascorbic acid. Potatoes and sweetpotatoes in 1909-13 provided the largest share of the ascorbic acid, over one-third, but since 1947-49 they have been supplying only about one-fifth of the total. Vegetables, other than tomatoes, potatoes, and sweetpotatoes now are the largest contributors of this nutrient and citrus fruits are next. The proportion of ascorbic acid provided by citrus fruits, however, has increased four-fold over the past half century.

Another shift in sources of vitamin A value and ascorbic acid is the increased proportion furnished by processed forms of vegetables and fruits. In 1909-13 fresh produce accounted for about 95 percent of these vitamins coming from all vegetables and fruits compared to about 65 percent in 1967.

Since 1909-13 the quantity of sodium available from foods comprising the national food supply has increased from 1.0 to 1.3 grams per capita per day; the quantity of potassium has decreased from 3.5 to 3.2 grams.

D. Food Acceptance and Food Habits

Acceptance of type A school lunch in Louisiana high schools. The amounts of foods consumed and rejected by tenth grade girls and boys at four Louisiana high schools was determined from the weights of foods served and the weights left on trays on three successive days. Boys consumed more of all foods except vegetables than girls. The highest percent of waste was noted in the vegetable group (approximately 50 percent) and the second highest in fruits (30 percent). There was little waste of milk and desserts. Acceptance of certain items differed in different schools. This may have been due to different methods of preparation.

E. Nutrition Programs Service

An intensified nutrition education program was initiated following release of the findings of the study on dietary levels of U. S. households surveyed in the spring of 1965. State nutrition committee chairmen were advised of the need for this program and were urged to take part in it. Nutritionists in states not having a committee were urged to form one. Assistance was provided seven states in developing nutrition education programs. Three workshops were developed; three seminars and ten talks were given to groups involved in community nutrition committees.

Bimonthly publications of Nutrition Program News, which reaches some 6,000 workers in nutrition and related fields, continued.

Publications - USDA and Cooperative Program

Food Consumption and Dietary Levels

- Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1968. Food Consumption of Households in the United States, Spring 1965. Household Food Consumption Survey 1965-66 Report No. 1. 212 pp.
- Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967. Food Consumption of Households in the United States, Spring 1965. A Preliminary Report. ARS 62-16. 28 pp.
- Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1968. Dietary Levels of Households in the United States. A Preliminary Report. ARS 62-17. 34 pp.
- Adelson, S. F. 1968. Changes in Diets of Households, 1955 to 1965-- Implications for Nutrition Education Today. Jour. Home Econ. 60(6): 448-455. (Also in Nutrition Program News, May-June. 4 pp.)
- Adelson, S. F. 1967. Changing Food Consumption in the United States. Family Economics Review, September, pp. 3-6.
- Adelson, S. F. and Peterkin, B. 1968. Quality of Diets in U.S. Households in Spring 1965. Family Economics Review, March, pp. 6-8.
- LeBovit, C. 1968. U.S. Diets and Enrichment. Jour. of Agric. and Food Chem. March-April, pp. 153-157.
- LeBovit, C. 1967. Expenditures for Food Away from Home. National Food Situation. NFS-122, Outlook issue, November, pp. 42-48. (See also Family Economics Review. December 1967, pp. 10-12.)
- LeBovit, C. 1967. Household Use of Food, 1955-65. National Food Situation. NFS-122, Outlook issue, November, pp. 38-39.
- Peterkin, B. and Ward, C. 1968. Nutrients From a Dollar's Worth of Food in the Northeast Region. Family Economics Review, June, pp. 3-6.
- Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967. The Family. Section 4 in the Handbook of Agricultural Charts, Agriculture Handbook No. 348. Figures 67-73. pp. 59-62.
- Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967. Consumption and Family Living. Chapter XI in Agricultural Statistics. Table 814. p. 696.

Consumer and Food Economics Research Division and Human Nutrition Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1968. Nutritive Quality of Diets, USA. A report to the Committee on Agriculture of the U.S. Department of Agriculture. 135 pp.

Food Management

Redstrom, R. A. 1967. Home Freezer Management Survey: Advantages and Disadvantages of Freezer Ownership; Defrosting Practices; Costs. Family Economics Review, September, pp. 6-10.

Nutritive Value of National Food Supply

Friend, B. 1968. Nutrients in United States Food Supply, A Review of Trends, 1909-13 to 1965. Am. Jour. Clin. Nutr. 20(8): pp. 907-914.

Friend, B. 1967. Nutritional Review. National Food Situation. NFS-122, Outlook issue. pp. 30-35.

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967. The Family. Section 4 in Handbook of Agricultural Charts, Agriculture Handbook No. 348. Figures 65 and 66. pp. 58-59.

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967. Consumption and Family Living. Chapter XI in Agricultural Statistics. Tables 812 and 813. pp. 694-695.

Nutrition Programs Service

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1968. Proceedings of Nutrition Education Conference, Feb. 20-22, 1967. Misc. Pub. No. 1075. 57 pp.

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967-68. Six issues of Nutrition Program News. July-August, 1967; September-October, 1967; November-December, 1967; January-February, 1968; March-April, 1968; May-June, 1968. 4 pp. each.

Hill, M. M. 1967. Discussion and Evaluation at Nutrition Education Conference. Nutrition Program News, July-August. 4 pp.

Hill, M. M. 1967. Interagency Committee on Nutrition Education. September-October. 4 pp.

Hill, M. M. 1968. State and Local Nutrition Committees. January-February. 4 pp.

Hill, M. M. 1968. Nutrition Education-in-Action. Home Health Care Agencies. March-April. 4 pp.

HUMAN NUTRITIONAL WELL-BEING
(RPA 708)

USDA and Cooperative Programs

| Location of Intramural Work | Scientist Man-years FY 1968 |
|-----------------------------|--------------------------------|
| Maryland (Hyattsville) | <u>1</u> / 15.1 |

Intramural program is supplemented by extramural support representing 1.8 SMY's at State Agricultural Experiment Stations.

1/ Includes the equivalent of 6.2 SMY's for service contracts for procurement and chemical analyses of various types of foods and meals.

Problems and Objectives

An increasing number of studies designed to provide knowledge about the relationship of food eaten by people to their physical and mental development and well-being are reported in the literature. Interpretation and evaluation of the findings and guidance in applying those with implications for food and nutrition programs are of vital importance if people are to obtain the greatest benefits from this research. Developments in cultural, breeding, and manufacturing practices introduce new food products and changes in the composition of others. The number of nutrients recognized as important continues to increase. Representative nutritive values that reflect these developments as well as the latest developments in analytical technics are required for application in a variety of problems. Source materials such as food budgets and dietary guides based on advancing knowledge are needed for use in nutrition and consumer programs.

Major objectives of the research include:

- (1) Development of representative nutritive values for all types of foods.
- (2) Review and interpretation of research findings on food and nutrition for application to and evaluation of action programs such as school lunch and commodity distribution to needy families.
- (3) Development of food guides and food budgets.

Progress - USDA and Cooperative Programs

A. Tables of Food Composition

1. Amino acid content of fruits and vegetables. Bananas and 52 varieties of fruits and vegetables that are produced in the United States are being analyzed for the Division by a contractor for the 18 amino acids commonly present in foods. The data are needed to supplement the very limited data now available on fruits and vegetables on the American market.
2. B-vitamins in foods. A recently completed survey of the literature on B-vitamins in foods showed that the absolute values reported by different authors for the pyridoxol, pyridoxal, and pyridoxamine content of a specific food often differ markedly but agree quite well on the relative proportion of the three forms. Processing and storage alter the relative proportions as well as the absolute content of these three free forms of vitamin B6. The survey also showed that research is needed to determine the biological activity of these three forms of the vitamin, as well as the effects of processing and storage on the proportions of them in many more plant and animal products.

3. Revision of Handbook 8. Work to obtain data for the next revision of Agriculture Handbook No. 8, "Composition of Foods...raw, processed, prepared," is proceeding along several lines. Research to provide information on the nutritive value of turkey has been initiated under contract at the University of Nebraska. Yields, physical and chemical composition of turkey carcass and its anatomical parts before and after cooking will be determined. A total of 200 Broad Breasted White turkeys age 16 to 26 weeks, raised, slaughtered and eviscerated according to commercial practice will be used. Proximate composition, cholesterol and selected minerals and vitamins will be determined.

Analyses designed to provide information on relationships among nutrients in milk and selected cheeses are continuing. This latter work is being carried out in cooperation with the Human Nutrition Research Division.

B. Nutritive Value of Meals as Served

1. Type A school lunch. Twenty-lunch composites obtained in the fall of 1966 from each of 300 schools located in 19 states and five geographic regions were analyzed for seven vitamins. On an average, the lunches which were identical with those served to sixth graders exceeded the nutritional goal of one-third of the 1968 NRC Recommended Dietary Allowance for ten to twelve year olds for vitamin A activity, riboflavin, niacin, vitamin B₁₂ and vitamin D. The average B₆ content equalled the nutritional goal. Riboflavin, which is safeguarded by the milk requirement of the type A pattern, exceeded the goal at all schools.

Meals served in some of the schools provided substantially less of some vitamins than is desirable. Vitamin A activity, vitamin B₆, thiamine and vitamin D were the nutrients most often short in lunches which failed to meet the nutritional goals. For more than half of the schools, lunches failed to meet the goal for one or more of these four vitamins. Only a small proportion of the schools served lunches that furnished less than one-fourth the daily Recommended Dietary Allowance for one or more vitamins. Except for this small proportion, the schools served lunches that could be considered reasonably satisfactory in vitamin content.

2. Nutritive value of meals--calculated vs. analyzed. In a recently initiated study, proximate composition and the amounts of selected fatty acids, vitamins and minerals in one week's meals from each of 50 universities and colleges throughout the country are to be determined by chemical analysis and by calculation, using the USDA tables of food composition. The purpose is to determine how closely the two methods of determining the nutritive value of meals agree.

C. Food Budgets and Guidance for Food Programs

The procedures for estimating the cost of food at home for the USDA food plans was revised to reflect changes in buying patterns that occurred between the 1955 and 1965 food consumption surveys. Use of the revised procedure

increased estimates of the cost of the low-cost and liberal food plans by four percent and the cost of the economy plan by eight percent. It resulted in no change in the estimate of the cost of the moderate-cost plan.

Expenditures of about 4,000 urban households surveyed in spring 1965 were compared with costs of the USDA plans at spring 1965 prices. Roughly 13 percent of the households used food valued at less than the cost of the economy plan. Twenty-five percent used food valued at less than the cost of the low-cost plan. Forty-five percent used food valued at less than the moderate-cost plan. Sixty-five percent used food valued at less than the liberal plan.

Nutrition research findings continue to be studied and interpreted for application to problems in food selection and food use. Special attention is given to providing support for action programs of the Department and of other government agencies. For example, the set of commodities made available to participants under the Direct Distribution Program was evaluated for nutritional adequacy. Also evaluated were alternative methods for improving the nutritional adequacy of the distributed commodities. These included recombination of the commodities, fortification of the commodities and the addition of new commodities. Menus using distributed commodities and based on the economy food plan are being developed for the use of leaders who work with families.

Technical assistance was given to the School Lunch Division of C&MS in the development of (1) a breakfast menu planning guide for use with the pilot school breakfast program and (2) meal patterns including minimum quantities of foods to serve, for use in special food service programs for children. An evaluation of the Type A Lunch Pattern is now being prepared using data obtained in the study of the composition of a week's lunches in 300 schools and taking into account the recently revised NRC Recommended Dietary Allowances.

Publications - USDA and Cooperative Programs

Tables of Food Composition

McCarthy, M. A., Orr, M. L., and Watt, B. K. 1968. Phenylalanine and Tyrosine in Vegetables and Fruits. Amer. Dietet. Assoc. Jour. 52(2): 130-134.

Nutritive Value of Meals as Served

Murphy, E. W., Grossman, E., and Forziati, F. H. 1968. The Nutritive Content of Type A Lunches. School Lunch Journal. 22(4): 11-18.

Food Budgets and Food Guides

Consumer and Food Economics Research Division. 1967. Cost of Food at Home. Family Economics Review. September, p. 24 and December, p. 24.

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1968. Cost of Food at Home. Family Economics Review. March, pp. 19-21 and June, pp. 13-14.

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1968. Cost of Food at Home Has New Base. Family Economics Review. June, p. 12.

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1968. Calories and Weight--The USDA Pocket Guide. Home and Garden Bulletin No. 153. 75 pp.

Human Nutrition Research Division and Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1968. Family Fare--Food Management Recipes. Home and Garden Bulletin No. 1. 79 pp.

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967. Consumption and Family Living. Chapter XI in Agricultural Statistics. Table 815. p. 697.

USE OF FAMILY RESOURCES
(RPA 802)

USDA and Cooperative Program

| Location of Intramural Work | Scientist Man-years FY 1968 |
|---|--------------------------------|
| Maryland (Hyattsville) | 5.3 |
| Intramural program is supplemented by extramural support representing 1.7 SMY's at State Agricultural Experiment Stations. | |

Problems and Objectives

Information on the resources available to families, the decisions families make regarding their use and the levels of living provided are needed to develop programs to improve levels of living.

Major objectives of the research are to

- (1) Determine the effects of economic and psycho-sociological factors on the allocation of family resources.
- (2) Identify the family financial management patterns that are associated with desirable levels of living.
- (3) Identify the levels of living obtainable in different socioeconomic situations.

Progress - USDA and Cooperative Programs

A. Rural Family Living Studies

1. Income needed for equivalent levels of living for farm and nonfarm families. Tentative indications are that farm families need at least 80 percent as much cash income as do nonfarm families to maintain equivalent levels of living. This is in contrast to the "poverty line" developed by the Social Security Administration and generally accepted as the official measure of poverty, which sets the needs of farm families at 70 percent of those of urban families. As home production among farm families tends to be concentrated among owners, owners appear to require less cash income than do renters to maintain a comparable level of living. The ARS research, which is based on a model of family disbursements, is designed to contribute to a more accurate assessment of the nation's poverty problem and to allocation of program funds to population groups where need is greatest.

2. Effects of credit on the pattern of family expenditures. Data from the 1960-61 Survey of Consumer Expenditures are being analyzed to determine (1) whether the use of credit to purchase durable goods and the consequent commitment of income to recurrent fixed payments reduces the level of spending on nondurables, particularly food, and (2) the interrelationships of the consumption and investment aspects of mortgage credit.

B. Management of Family Resources

1. Resource conservation and augmentation in household activity patterns. In progress under a research grant at Michigan State University is a study to obtain information on factors that contribute to the rise of families out of poverty. The use of time, income and equipment in the performance of household tasks is being studied in two groups of low-income nonfarm families, half of which had improved their economic position during the past six years, half of which had not.

2. Time used for household tasks. Data on use of time in household activities obtained from 1,300 families in Onondaga County and Syracuse, New York, in 1967-68 are being analyzed at Cornell University under a research grant. The purpose is to develop unit-of-work values for major household tasks. These values are needed to measure the time-work-load in families at different stages of the family life cycle and to determine the effect on the ratio of input-of-time to output-of-work of such factors as employment of the homemaker, socioeconomic status of the family, place and type of residence, and season of the year.

C. Clothing Acquisitions and Care

Of 419 low-income Des Moines families surveyed, 39 percent made some clothing during the survey year. Expenditures of these families for such clothing were small, averaging only \$9.20 for families that were headed by husband and wife and \$13.16 for families headed by a woman. The larger the family income, the more likely was the family or individual to do home sewing. No significant differences were found in inventories, acquisitions and inventory-acquisition ratios of selected garments between those who had and those who did not have home-constructed clothing.

Seventy percent of the families washed clothes at home by machine, 27 percent used coin-operated machines, and 3 percent used other methods. Among the 351 husband-wife families, washing at home by machine was significantly more common where there were more children, more female children, nonemployed wives, and older wives. Among the 68 families with a female head, washing at home by machine was more common where income was higher. Clothes dryers were used by 59 percent of all families.

These findings are from a study of clothing practices of low-income families which is being carried out under cooperative agreement with Iowa Agriculture and Home Economics Experiment Station. The ultimate objective is to use the data in the development of clothing budgets that take into account existing inventories and acquisitions other than purchases.

D. Family Economics Review and Outlook Conference

Family Economics Review which was published quarterly began its twenty-sixth year of publication with the April issue. The Division was responsible for the planning of four sessions on family living at the 1967 Outlook Conference and for the presentation of three papers at these sessions.

Publications--USDA and Cooperative Programs

Management of Family Resources

Consumer and Food Economics Research Division. 1968. Helping Families Manage Their Finances. Home Economics Research Report No. 21. Revised. 51 pp.

Clothing Acquisition and Care

Heinemayer, C. J. K. 1968. Clothing Care and Construction Practices of Low to Moderate Income Families in a Midwestern City. M.S. Thesis, Iowa State University. 231 pp.

Family Economics Review and Outlook Reports

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967-68. Four issues of Family Economics Review, ARS 62-5. September 1967, 24 pp.; December 1967, 24 pp.; March 1968, 24 pp.; June 1968, 24 pp.

Bivens, G. E. 1968. The Years Ahead: Focus on Consumers. Family Economics Review, June, pp. 9-12.

Britton, V. 1967. Mobility in the United States. Family Economics Review, September, pp. 16-20.

Holmes, E. G. 1968. Families Then and Now. Family Economics Review, March, pp. 3-6.

Krassa, Lucie G. 1968. Home Ownership and Rent in the Consumer Price Index. Family Economics Review, June, pp. 16-18.

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967. The Family. Section 4 in Handbook of Agricultural Charts 1967. Agriculture Handbook No. 348. Figures 63-64, pp. 56-63.

SELECTION AND CARE OF CLOTHING AND
HOUSEHOLD TEXTILES
(RPA 705)

USDA and Cooperative Programs

| Location of Intramural Work | Scientist Man-years FY 1968 |
|----------------------------------|--------------------------------|
| Maryland (Beltsville <u>1</u> /) | 0.2 |
| Tennessee (Knoxville) | 0.5 |
| <u>Total</u> | <u>0.7</u> |

Intramural program is supplemented by extramural support representing 1.5 SMY's at other U. S. institutions.

1/ Work at Beltsville was discontinued early in FY 1968.

Problems and Objectives

Research on the selection, use and care of clothing and household textiles is needed to help consumers obtain maximum benefit from the ever changing variety of fibers, fabric constructions and finishes used in these items. Studies of body dimensions are needed as a basis for improved sizing of patterns and garments.

Major objectives of the research 2/ are to determine

- (1) Methods of predicting performance of fabric in use.
- (2) Methods for removal of soils and prevention of undesirable changes in textiles.
- (3) Methods of controlling the dissemination of microorganisms by clothing and household textiles.
- (4) Body dimensions of all sizes and types of U. S. women and children.

Progress - USDA and Cooperative Programs

A. Dissemination of Microorganisms by Fabrics

Research has been initiated to provide quantitative data on the survival and infectivity of a poliovirus and vaccinia virus during home-type laundering. This work is being carried out by Southern Research Institute working under contract.

B. Anthropometric Measurements Basic to the Sizing of Apparel

Changes in body dimensions of young women. Weight and 14 other body dimensions were determined during 1966-67 on 355 20- to 29-year-old women residing in the greater Boston area. Extensive comparisons with the corresponding dimensions and proportions of almost 2,000 20- to 29-year-old subjects of the comprehensive USDA body measurement study of 1939-1940 show that significant changes have occurred. On the average, the young women of 1966 were taller but did not differ significantly in bust girth or in weight from the young women of 1939. In proportion to total height, the women measured in 1966 had smaller bust, waist and hip girths than their counterparts of 1939. In proportion to weight, the young women of 1966 had smaller waist and hip girths. They also had waists that were smaller in proportion to bust and hip girths and hips that were smaller in proportion to bust girth than the women

2/ Initiation of further work is awaiting assignment of additional personnel to the Textiles and Clothing Laboratory at Knoxville.

of 1939. The differences observed indicate that a more comprehensive anthropometric study of women is needed as a basis for a system of sizing that will provide a better fit for a higher proportion of today's women than the present system.

Publications - USDA and Cooperative Programs

Dissemination of Microorganisms by Fabrics

Sidwell, R. W., Dixon, G. J., and McNeil, E. 1967. Quantitative Studies on Fabrics as Disseminators of Viruses. III. Persistence of Vaccinia Virus on Fabrics Impregnated with Virucidal Agent. Applied Microbiology 15(4): pp. 921-927.

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967. Sanitation in Home Laundering. Home and Garden Bulletin No. 97. Revised. 8 pp.

Removal of Soil and Prevention of Undesirable Changes in Textiles

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1967. Soaps and Detergents for Home Laundering. Home and Garden Bulletin No. 139. 8 pp.

